

# ATOMIC LAYER DEPOSITION OF METALLIC CONTACTS, GATES AND DIFFUSION BARRIERS

## ABSTRACT OF THE DISCLOSURE

The present invention provides metallic films containing a Group IVB or VB metal, silicon and optionally nitrogen by utilizing atomic layer deposition (ALD). In particular, the present invention provides a low temperature thermal ALD method of forming metallic silicides and a plasma-enhanced atomic layer deposition (PE-ALD) method of forming metallic silicon nitride film. The methods of the present invention are capable of forming metallic films having a thickness of a monolayer or less on the surface of a substrate. The metallic films provided in the present invention can be used for contact metallization, metal gates or as a diffusion barrier.